



Woven Concrete

Belford, P., Morrow, R., Crangle, A., & Campbell, D. (2009). Woven Concrete. In *Unknown Host Publication* University of Leeds.

[Link to publication record in Ulster University Research Portal](#)

Published in:
Unknown Host Publication

Publication Status:
Published (in print/issue): 03/08/2009

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WOVEN CONCRETE a Tactility Factory Project

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Tactility Factory

makes hard surfaces...softer and more tactile

Tactility Factory (TF) is a collaboration between a textile designer and an architect

TF applies **the techniques and technologies of textiles to the manufacture of hard materials** producing highly tactile and desirable surfaces

'mainstreaming tactility in the built environment'

Trish Belford textile pre-Tactility Factory

Over the last 3 years

Tactility Factory

has developed **Girli Concrete**

Girli Concrete combines concrete and textile technologies

TF has resolved the technical challenges of placing delicate fabrics into the aggressive environment of Concrete

Textiles are specifically designed and manufactured to be placed in concrete

'Breakthrough' Technologies ensure that the textiles remain on the 'face' surface - the textiles are neither swamped by concrete nor do they peel off

The result is a fully integrated, highly tactile surface of concrete and textile



embroidered concrete detail

Tactility Factory

will license 3 technologies

- 1. embroidered concrete:**
the outcome looks as if the concrete has been stitched into. The surface is robust and possibly suited to external environments. Currently developing collaboration with Hand & Lock, London- bespoke global embroidery company (they have offered £30,000 product for G-Concrete use)
- 2. puckered concrete:**
linen and stainless steel woven fabric results in a unique 3 dimensional surface (acoustic properties)
- 3. linen concrete:**
The properties of linen mean it's a natural choice for use in concrete - we use multi layered fabrics to control the integration of concrete and linen

These three technologies are registered for patents



TF's Linen Concrete sample

FUTURE Potentials and Benefits:

Tactility Factory

During R&D, TF developed a lot of techniques/ technologies combining concrete and textiles - which have been set aside in order to focus on refining 3 technologies. There remains much more to exploit within the girli concrete range.

Not least- its **acoustic properties**.

Concrete surfaces are hard and acoustically, highly reflective. Their mass makes them ideal sound barriers. A soft surface concrete allows TF to exploit the acoustic strengths of concrete and resolve its acoustic weakness.

TF is currently working with the University of Sheffield to test and design fabrics which once embedded in concrete create a unique acoustic profile.

Embroidered concrete detail

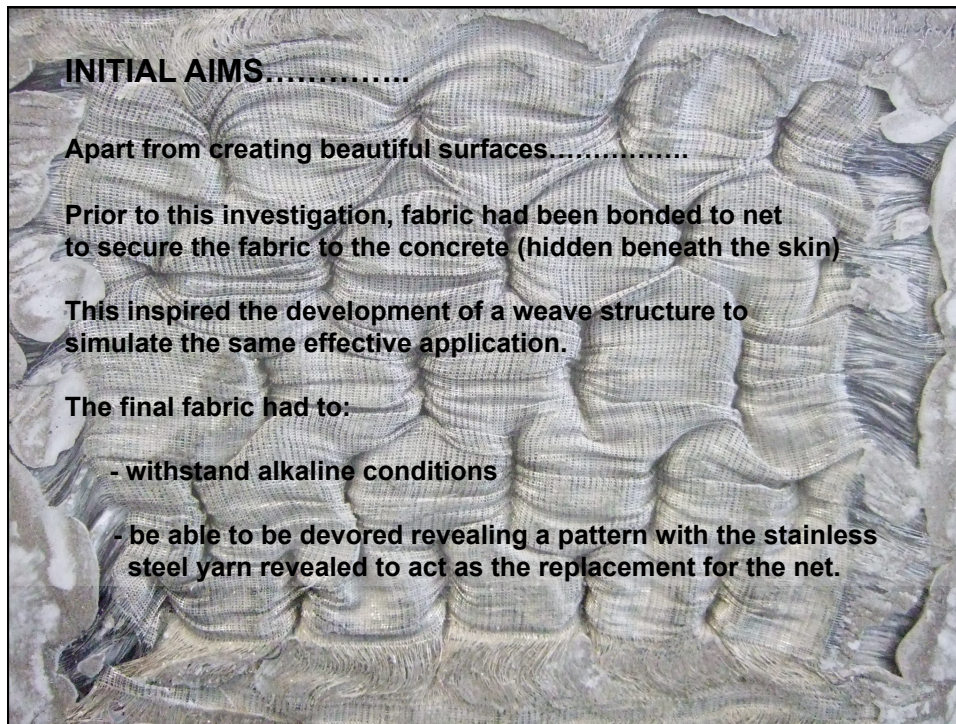
**Benefits for industry and university:**

Unique distinctive project, interesting local story, strong profile.

Cross-disciplinary practice-based research that links high levels of creativity (blue sky thinking) with academic and practical outputs

Linen bonded to a mesh before embedding, the concept of **Woven Concrete** was to remove this process





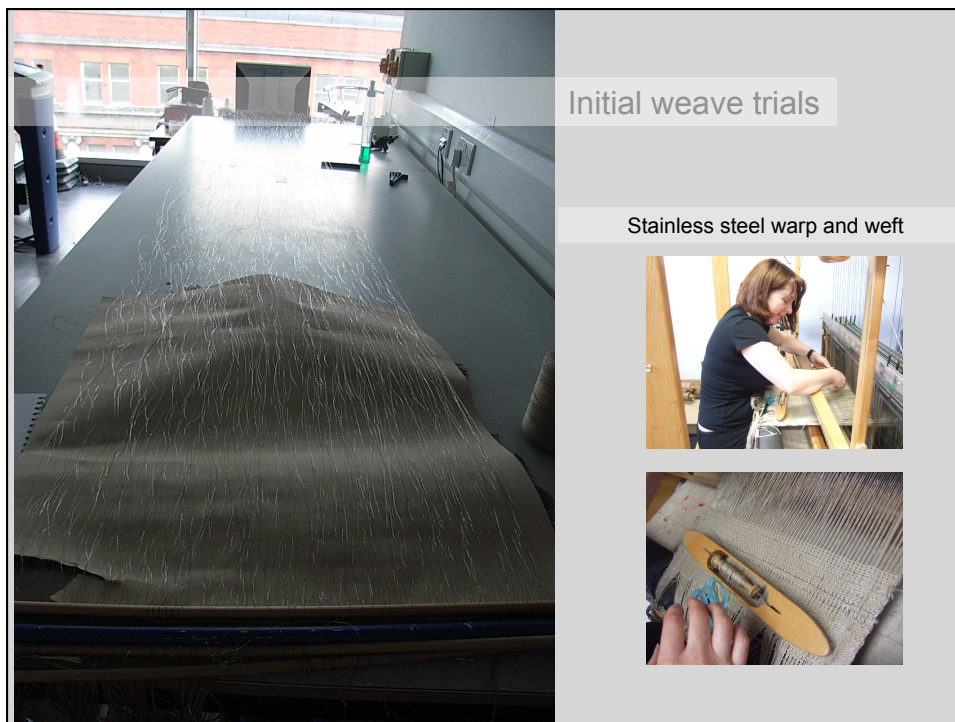
YARN TRIALS

to identify yarns suitable for integration into concrete identifying fabrics that would be durable in the alkaline environment of concrete.

Exposure time in days (0.1M NaOH)	WOOL	SILK	FLAX	POLY PROPYLENE	S Steel
7 DAYS	OK	OK	OK	OK	OK
23 DAYS	OK	OK	OK	OK	OK
49 DAYS	Breaks up with manual handling <i>Experiment terminated</i>	Breaks up with manual handling <i>Experiment terminated</i>	OK	OK	OK
109 DAYS	Decolouration of yarn as lignin/pectin goes onto solution in the alkali. No deterioration in strength	No Visual deterioration or obvious strength deterioration	No Visual deterioration or obvious strength deterioration	No Visual deterioration or obvious strength deterioration	No Visual deterioration or obvious strength deterioration

CONCLUSION FROM YARN TRIALS

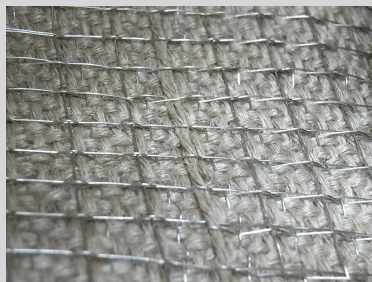
- Protein fibres (wool & silk) do not like the alkaline environment presented in concrete.
- Flax / Linen which is cellulose based and commonly undergoes short term textile wet treatments in an alkaline environment will be selected for the purposes of this research.
- A stainless steel yarn to be incorporated in the weave structure, this weave construction will act as the unseen gripper beneath the skin of the concrete.





True Leno

- Investigated as a potential means to secure the structure of the mesh, working on the principle of 2 warp ends working together to bind and lock the weft insertion.
- Small samples worked well but production not possible due to time restraints and twisting of the 0.22mm diameter stainless steel



Mock Leno

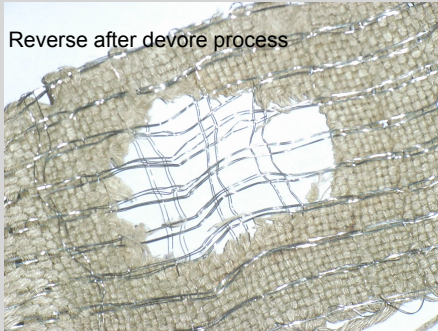
- Leno shafts replaced with standard shafts to create a mock effect.
- Although solving some of the time issue problems to configuration of a stainless steel warp and weft needs consideration from a practical point of view.

DEVORE TRIALS and concrete

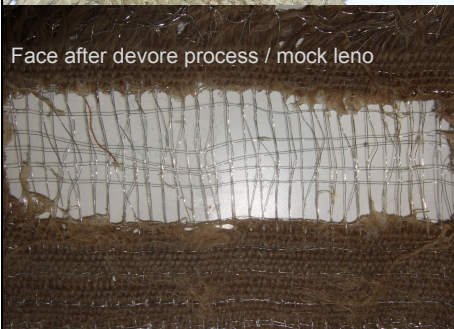
Face after devore process / leno weave



Reverse after devore process



Face after devore process / mock leno



Embedded in concrete



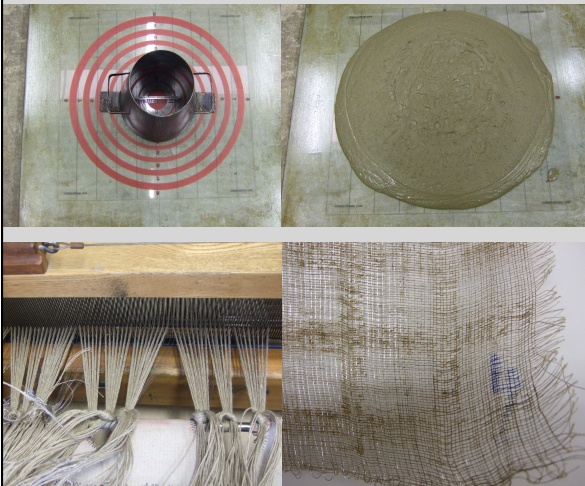
REFLECTION

- Leno construction mock or otherwise is too complicated for our end goal.....you can get too carried away in the detail

- Using stainless steel and linen yarn, the steel was only inserted into the weft, and it's still a beautiful fabric, fulfilling the ultimate aim to weave a fabric that allowed itself to be embedded in concrete without "DESTROYING THE FAÇADE AESTHETICS"



PART OF THE PROCESS



The **woven concrete** project: collaboration between an architect and textile designer seeks to bring together technologies of concrete and textiles, understanding the workings of both is pivotal to the success of the product of the

The Tactility Factory
www.tactilityfactory.com



The Derry Playhouse



Having resolved the technological challenges of giri concrete

Tactility Factory

wishes **now** to:

- 1. Maintain an R&D Unit**
(in the university)
TF has attracted approx £40K during the development of Giri Concrete. We wish to continue designing, testing and exploiting other hard/soft processes and building products and have submitted recent research council application for £750K to develop the **Tactility Laboratory**
- 2. Develop a Bespoke Workshop**
(external to university)
To carry on one-off, bespoke commissions allowing TF to carry out live R&D testing and use such commissions to attract publicity acting as the 'Haute Couture' to off-the-shelf range (see below)
- 3. License existing technologies / product packages**
to global Partner Companies to manufacture off-the-shelf ranges

Linen Concrete Petal Detail

